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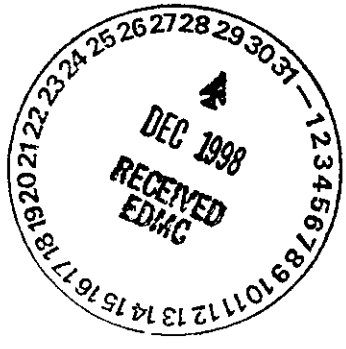
Revision 2

Pollution Prevention and Best Management Practices Plan for State Waste Discharge Permits ST 4508 and ST 4509



United States
Department of Energy
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Revision 2

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Pollution Prevention and Best Management Practices Plan for State Waste Discharge Permits ST 4508 and ST 4509

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RELEASE AUTHORIZATION

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APPROVED FOR PUBLIC RELEASE

V. L. Birkland 12/09/98

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ACRONYMS

BMP	best management practice
CERCLA	*Comprehensive Environmental Response, Compensation, and Liability Act of 1980*
DOE-RL	U.S. Department of Energy, Richland Operations Office
Ecology	Washington State Department of Ecology
ERT	electrical resistance tomography
GWQC	Ground Water Quality Criteria
HAMMER	hazardous materials management and emergency response
HVAC	heating, ventilation, and air conditioning
NPDES	National Pollutant Discharge Elimination System
TEDF	Treated Effluent Disposal Facility
WAC	Washington Administrative Code

METRIC CONVERSION CHART

Into metric units			Out of metric units		
If you know	Multiply by	To get	If you know	Multiply by	To get
Length			**Length**		
inches	25.40	millimeters	millimeters	0.0393	inches
inches	2.54	centimeters	centimeters	0.393	inches
feet	0.3048	meters	meters	3.2808	feet
yards	0.914	meters	meters	1.09	yards
miles	1.609	kilometers	kilometers	0.62	miles
Area			**Area**		
square inches	6.4516	square centimeters	square centimeters	0.155	square inches
square feet	0.092	square meters	square meters	10.7639	square feet
square yards	0.836	square meters	square meters	1.20	square yards
square miles	2.59	square kilometers	square kilometers	0.39	square miles
acres	0.404	hectares	hectares	2.471	acres
Mass (weight)			**Mass (weight)**		
ounces	28.35	grams	grams	0.0352	ounces
pounds	0.453	kilograms	kilograms	2.2046	pounds
short ton	0.907	metric ton	metric ton	1.10	short ton
Volume			**Volume**		
fluid ounces	29.57	milliliters	milliliters	0.03	fluid ounces
quarts	0.95	liters	liters	1.057	quarts
gallons	3.79	liters	liters	0.26	gallons
cubic feet	0.03	cubic meters	cubic meters	35.3147	cubic feet
cubic yards	0.76456	cubic meters	cubic meters	1.308	cubic yards
Temperature			**Temperature**		
Fahrenheit	subtract 32 then multiply by 5/9ths	Celsius	Celsius	multiply by 9/5ths, then add 32	Fahrenheit
Force			**Force**		
pounds per square inch	6.895	kilopascals	kilopascals	1.4504×10^{-4}	pounds per square inch

Source: *Engineering Unit Conversions*, M. R. Lindeburg, PE., Second Ed., 1990, Professional Publications, Inc., Belmont, California.

1.0 INTRODUCTION

On December 23, 1991, the U.S. Department of Energy, Richland Operations Office (DOE-RL) and the State of Washington, Department of Ecology (Ecology) agreed to adhere to the provisions of Ecology Consent Order No. DE 91NM-177 (Consent Order). The Consent Order lists regulatory milestones for liquid effluent streams on the Hanford Site to comply with the permitting requirements of Washington Administrative Code (WAC) 173-216, *State Waste Discharge Permit Program*, or WAC 173-218, *Washington Underground Injection Control Program*, where applicable.

Hanford Site liquid effluent streams discharging to the soil column are categorized in the Consent Order as follows:

- Phase I Streams
- Phase II Streams
- Miscellaneous Streams.

Phase I and Phase II Streams are addressed in two DOE-RL reports: *Plan and Schedule to Discontinue Disposal of Contaminated Liquids into the Soil Column at the Hanford Site* (DOE-RL 1987), and *Annual Status of the Report of the Plan and Schedule to Discontinue Disposal of Contaminated Liquids into the Soil Column at the Hanford Site* (Stordeur 1988). There originally were 33 Phase I and Phase II Streams; however, some streams have been eliminated. Miscellaneous streams are those liquid effluent streams discharged to the ground that are not categorized as Phase I or Phase II Streams. Source waters of miscellaneous streams originate directly from the Columbia River, from treated Columbia River water, or from groundwater and demineralized water. Miscellaneous streams result primarily from source water used in processes such as cooling, hydrotesting, and steam generation. Miscellaneous streams also occur through the use of these source waters for maintenance and construction activities such as draining, flushing, and washing.

Miscellaneous streams discharging to the soil column on the Hanford Site were subject to the requirements of several milestones identified in the Consent Order (DE 91NM-177). The *Plan and Schedule for Disposition and Regulatory Compliance for Miscellaneous Streams* (DOE/RL-93-94) provides for the disposition of miscellaneous streams to satisfy one of the Consent Order Section 6 requirements. Additional commitments established in the plan and schedule (Activity 6-2.3 and 6.2.4) were to submit WAC 173-216 Categorical State Waste Discharge Permit applications for hydrotest, maintenance, and construction waste water, and cooling water and condensate discharges.

The *State Waste Discharge Permit Application, Hydrotest, Maintenance, and Construction Discharges* (DOE/RL-95-93) was submitted to Ecology in November 1995. Ecology issued State Waste Discharge Permit ST 4508 on May 30, 1997. The *State Waste Discharge Permit Application, Cooling Water and Condensate Discharges* (DOE/RL-96-41) was submitted to Ecology in September 1996. Ecology issued State Waste Discharge Permit ST 4509 on May 1, 1998.

Condition S5 of State Waste Discharge Permits ST 4508 and ST 4509 requires the permittee to develop and implement a pollution prevention and best management practices (BMP) plan for all discharges covered. This Pollution Prevention and Best Management Practices Plan (Plan) is enforceable per Condition S5.B of each permit. Failure to comply with the plan constitutes a violation of each permit.

1.1 ORGANIZATION

This Plan is divided into sections that address all technical requirements of Permits ST 4508 and ST 4509. The permits should be referred to directly for guidance on and compliance with requirements.

Hydrotest, maintenance, construction, cooling water, and condensate discharges and other relevant discharge processes covered by the permits, and guidance on handling these discharges, are presented in Sections 2.0, 3.0, 4.0, 5.0, and 6.0 respectively. Section 7.0 describes some general pollution prevention methods and BMPs, and why these methods and practices are effective in preventing groundwater contamination. Section 8.0 contains the permits requirements for all discharges and the permittee's policy on the discharges. Section 9.0 describes categories of miscellaneous streams that are exempt from the requirements of Permits ST 4508 and ST 4509, and of this Plan. Section 10.0 cites references used in the preparation of this document. Appendix A contains summary tables of BMPs for each of the processes covered by the permits and this Plan. Appendix B contains a log form to track significant discharges in accordance with Permit ST 4508.

A separate document, *Miscellaneous Streams Best Management Practices (BMP) Report* (DOE/RL-96-40) was written specifically to evaluate miscellaneous streams that potentially were contaminated as defined by specific criteria outlined in DOE/RL-93-94). The BMP categories include (1) streams discharging to surface contaminated areas; (2) potentially contaminated streams, and (3) streams discharging near cribs, ditches, or trenches. Each stream meeting any of these criteria was evaluated to determine a method or BMP to minimize the impact on groundwater.

1.2 APPROACH

Hydrotest, maintenance, construction, cooling water, and condensate discharges were identified based on specific activities. The summary of discharges identified for this Plan is provided in Table 1-1. Descriptions of the discharge processes are provided in Sections 2.0 through 6.0.

Table 1-1. Summary of Discharges Covered under Permits ST 4508 and ST 4509.

Hydrotest	Maintenance	Construction	Cooling Water	Condensate	Other
System or component testing	Drainage	Concrete curing and rinsate	Air compressors	Steam lines/heating systems	HAMMER Pond
Development testing	Flushing	Pressure washing	Engines	Air compressors	Pump leak water
	Washdown activities	Acid etching	Evaporative cooling	Air conditioning	Valve waste water
	Eye wash/safety shower testing		Air conditioning	Ice machines	Water tank overflow
			Ice machines	Ventilation systems	

HAMMER = Hazardous Materials Management and Emergency Response.

2.0 HYDROTEST DISCHARGES

Hydrotesting is the process of testing the integrity of systems or components (i.e., tanks, pipes, or pumps). Examples of hydrotest processes that involve wastewater discharge are system or component testing and development testing. These two Hydrotesting processes are described in the following sections. A checklist of BMPs for hydrotest discharges is provided in Table A-1.

2.1 SYSTEM OR COMPONENT TESTING

System or component testing is performed by methods such as measuring static pressure drops or by applying pressure to check only for leaks, not drops in pressure. Measuring static pressure is accomplished by filling the tanks or pipes with any of the approved source waters and applying hydrostatic pressure on the tank or pipe. With all valves or clamps closed off, observation detects any drop in the measured pressure in the tank or pipe. A drop in pressure indicates a weakness in the pipe or tank walls. When the testing is complete, the valve or clamp is opened and water is allowed to discharge to the soil column. This process also can be applied to valves and fittings to determine their susceptibility to leaks and spills.

Hydrotesting usually is performed as part of acceptance testing during construction of a new facility, but also can be done during routine integrity testing, upgrading, troubleshooting, or repairing of an existing system. Examples of different types of standard testing practices include but are not limited to acceptance testing, qualification testing, pre-operational testing, operational testing, and production/process testing.

2.2 DEVELOPMENT TESTING

Development testing is performed to provide or develop the following:

- Design information, concepts, or criteria
- Calculate and verify design, safety, or reliability concepts or criteria
- Develop performance characteristics through the use of mock-ups or test facilities
- Study and research activities
- Develop engineering specification requirements and specific design objectives
- Resolve engineering or technological issues.

These discharges are typically of potable or raw Columbia River water, groundwater, or demineralized water that might have some specific material added.

Examples of development testing are tracer studies and experimental discharges.

- **Tracer Studies.** Tracer studies are used to determine the routing of piping systems. It often is necessary to perform tracer studies when performing water balance studies, mapping flow systems, and verifying drawings or existing flow maps. Typically, flooding a system with water and adding a marker (either a dye, or anion such as bromide, or chloride) performs these studies. Positive pressure is applied to the system, and samples are taken at various locations considered downstream. If sample analysis results are positive, the location is verified.

- **Experimental Discharges.** This category could include other discharges related to experimentation or research. For example, experimental discharges from electrical resistance tomography (ERT) and the hydraulic test bed might be included. The purpose of the ERT research is to detect leaks in underground tanks by injecting raw or potable water with a sodium chloride tracer into the ground and measuring the electrical resistance between the electrodes. The purpose of the hydraulic test bed test is to evaluate retrieval technologies from simulants consisting of bentonite and kaolin solutions. Water generated from these tests contains a high solids content and is not acceptable for discharge to existing sewer systems. This water is discharged directly to the ground and allowed to evaporate or percolate.

3.0 MAINTENANCE DISCHARGES

Maintenance activities often produce wastewater discharges. These discharges normally are performed during routine maintenance tasks, and could consist of potable or raw water from the Columbia River or potable water from groundwater wells. Discharges also could be performed as a part of facility and system deactivation activities. For example, reservoirs and pipe systems could be flushed with clean water and deactivated. Examples of maintenance discharges on the Hanford Site are described in the following. A checklist of BMPs for maintenance discharges is provided in Table A-1.

3.1 DRAINAGE

Periodically, reservoirs and pipe systems that hold water need to be drained to perform maintenance activities such as sealing repairs, upgrading a section of pipe, replacing valves or other components, rerouting the flow, or system deactivation/shutdown. Draining activities could occur at various filter basins (i.e., water treatment plants), water tanks, sumps, or other related equipment.

3.2 FLUSHING

Flushing is the process of washing dirt and construction debris from the inside of piping, tanks, and other related equipment. This process requires only enough water to wash the debris from the inside of equipment. Water used for this process is monitored visually for cleanliness. Flushing is complete when the water visually appears clean. Raw water, groundwater, or potable water is used for this process and is not allowed to come in contact with constituents that would cause the discharge to exceed 110 percent of the WAC 173-200 "Groundwater Quality Criteria".

Flushing also is performed to disinfect potable water lines. Disinfecting potable water lines kills bacteria present inside the piping system. During disinfecting activities, the water lines are filled with chlorinated water for up to 2 days. After sample analysis shows no bacteria are present, the water is discharged to the ground. Disinfection precedes flushing, so only clean water is discharged. Disinfection could be performed during maintenance and construction activities.

3.3 WASHDOWN ACTIVITIES

Washdowns are performed periodically as maintenance activities. Washdowns include road, equipment, buildings, and other similar activities. Small amounts of detergents sometimes are used to perform these activities.

- **Pressure Washing.** It often is necessary to wash and clean parts or surfaces during maintenance activities. Pressure washing is used to clean a surface to applying special coatings; removing rust, dirt, and grit from parts before painting; and/or to prepare a surface for welding or bonding. Pressure washing also is used for general maintenance and facility cleaning. Potable or raw water is used for pressure washing. If detergents or additives are used, they should be minimized.

- **Road Washing.** The roads are washed down to remove salts, oil, and other miscellaneous debris. Potable or raw water is used for road washing, and sometimes detergents are used. Use of detergents or additives are minimized.

- **Building Washing.** These activities could include general building cleaning, window cleaning, exterior maintenance, and other exterior building-related tasks. Raw or potable water is used for building washing. Use of detergents or additives used are minimized.

3.4 EYE WASH AND SAFETY SHOWER DISCHARGES

Routine safety shower and eye wash station maintenance testing is performed to ensure systems operate and perform properly. During testing activities, clean potable water is discharged. During emergency situations, if significant quantities of contaminants are removed from an individual, efforts are made to minimize discharge to the environment. If significant quantities of contaminants are removed from an individual and discharged with the potential to threaten groundwater, the discharge is cleaned up and managed appropriately. Appropriate management could include sampling for potential contamination, excavating contaminated media, and proper disposal.

4.0 CONSTRUCTION DISCHARGES

Examples of construction processes that involve wastewater discharges include concrete curing, pressure washing, and acid etching. These processes are described in the following sections. A checklist of BMPs for construction discharges is provided in Table A-1.

4.1 CONCRETE CURING AND RINSATE

To aid in the curing process, a concrete structure could be sprayed with water or a solution of water and a curing agent (generally wax or paraffin-based, although in some rare situations an epoxy-based agent is added). If only water is used to assist the curing, the concrete is covered in burlap and sprayed with water. Water might drain off the edges of the concrete. If a curing agent is used, the solution is applied with a pressurized hand-sprayer to minimize the amount of solution used. In addition, concrete trucks and tools used for construction are cleaned and the rinse water is discharged onto the ground (AGC 1990).

4.2 PRESSURE WASHING

It often is necessary to wash and clean parts, equipment, or surfaces during construction activities. Pressure washing might be used to clean a surface as preparation for applying special coatings, removing rust, dirt, and grit from parts before painting, and/or to prepare a surface for welding or bonding.

4.3 ACID ETCHING

Acid etching might be used to etch concrete to accommodate a coating of paint or other special protective coatings inside or outside of buildings. In this process, water is added to the surface of the concrete. A 10 percent solution of 33 to 37 percent muratic acid or 15 percent solution of 60 to 80 percent phosphoric acid is spread onto the concrete. The rinse water is collected, the pH is tested, and, if indicated, lime is added to raise the pH to groundwater discharge standards. Sometimes a base such as tri-sodium phosphate is used to neutralize the material.

5.0 COOLING WATER AND CONDENSATE DISCHARGES

The following sections provide descriptions of the equipment that generate cooling water and condensate discharges. For each type of equipment, the types of wastewater discharge are identified.

5.1 AIR COMPRESSORS

Air compressors are used to provide compressed air to equipment and/or systems. Many types of compressors use a water-filled cooling jacket to cool the system. The water discharged from the cooling jacket becomes a wastewater stream. As the air is cooled by the cooling system, the water vapor is condensed. A trap located at a receiver tank collects the condensed water and periodically discharges the water as blowdown.

The source water used for the cooling jacket is potable water. This system is usually a once-through, non-contact system. The wastewater generated is the same type of water as the source water, because the cooling systems are separated from the mechanical parts of the compressor.

5.2 ENGINES

Internal combustion engines are used to provide emergency backup for electrical or steam driven systems in case of emergency or operational failure of the primary systems. Cooling is essential to diesel-fueled systems and a water cooling system is used to cool the engine. The cooling system is a once-through, non-contact system that separates the water from the mechanical parts of the engine; therefore, contamination of the wastewater does not occur.

5.3 HEATING, VENTILATION, AND AIR CONDITIONING

Wastewater streams are produced by equipment and/or individual systems within a heating, ventilation, and air conditioning (HVAC) system, such as heating system stream traps, air conditioning cooling coils and heat exchangers, evaporative overflow, and ventilation stack demisters.

5.3.1 Heating System

Many of the facilities use steam or steam jackets as a heat source to maintain constant temperature for building heat or for heating tank systems. As the steam travels through the piping, from the boiler into

the facility, contact with the cooler pipe and/or equipment surfaces allows the steam to condense. The condensate is discharged from the system through manual blowdown valves during startup, to quickly fill a heater with steam. The steam trap valve is activated at a predetermined pressure setting, which releases, discharging the condensate in the trap.

5.3.2 Air Conditioning

Air conditioning systems cool building air through the use of a compressor and a heat exchanger to cool incoming air. The operation of the compressor generates large amounts of heat, which is dissipated from the system using a once-through, non-contact, water-cooled heat exchanger, or an air-cooled heat exchanger. As the temperature drops, condensate is formed, collected, and discharged from the system.

5.3.3 Evaporative Cooling

Another air conditioning system that creates a cooling water stream is an evaporative cooling system. Evaporative cooling uses the cooling effect of evaporating water to cool a recirculating water stream. Because of the evaporation process, a small amount of cooling water is allowed to overflow and discharge.

5.4 ICE MACHINES

Ice machines use a refrigerant-air heat exchanger to cool an air stream that is used to cool water to freezing temperatures, and a compressor that changes the refrigerant vapor leaving the evaporator back to a liquid before re-entering the heat exchanger. As the air is cooled in the heat exchanger, the air forms condensate that is collected and discharged as wastewater.

6.0 OTHER DISCHARGES

Discharges that do not appear to be in one of the categories of Permits ST 4508 and ST 4509, but are of similar quality and quantity to other covered discharges, are identified as follows. These discharges are identified in Permits ST 4508 and ST 4509.

6.1 HAZARDOUS MATERIALS MANAGEMENT AND EMERGENCY RESPONSE (HAMMER) TRAINING

The training water pond discharges an estimated 1,000 gallons per day to the ground. The discharge is unintentional and results from a leaking liner. The pond collects water that has been used during training activities and stores the water for reuse. The source water is Richland city water (potable water) that is treated at the pond to control algae and bacteria growth, which maintains an acceptable quality for use in training activities. A checklist of BMPs for the HAMMER pond discharge is provided in Table A-2.

6.2 PUMPS

A pump wastewater source can be generated by either the necessary cooling equipment (i.e., the pump driver) or from leaks caused by preventive maintenance or aging components (packing and/or seals).

Leaks could occur around worn or loosely fit packing or pump seals. The source water from pump leaks can include raw, potable, or demineralized water.

6.3 VALVES

Water lines use several different types of valves to control the pressure and flow of the water. Many of these valves produce a water discharge during operation. The source water from pump leaks can include raw, potable, or demineralized water. The following type of valves contribute to wastewater discharges:

- Pressure relief valves. When the pressure exceeds the desired operational limits in a water line, the pressure relief valve opens.
- Control valves. Different types of control valves are used on water lines, but the basic common function is to regulate and/or control the flow of water through the lines.
- Vent valves. Vent valves are used on water lines to release air trapped in the lines when the lines are in use or are placed in service.

6.4 WATER TANKS

Potable water stored in high water tanks is allowed to discharge to help eliminate mineral and bacteria buildup within the tanks and to prevent freezing. This water is discharged continuously at low volumes throughout the year. Other discharges that fall within this category include an elevator shaft that has potential to receive water from broken water lines, and quench tank cooling water used to cool carbon and stainless steel.

7.0 BEST MANAGEMENT PRACTICES

BMPs, as defined in WAC 173-200, are "schedules of activities, prohibition of practices, maintenance of procedures, and other management practices to prevent or reduce the pollution of groundwater of the state. BMPs also include treatment requirements, operating procedures and practices to control plant site runoff, spillage or leaks, sludge or water disposal, or drainage from raw material storage." The National Pollutant Discharge Elimination System (NPDES) guidance (EPA-600/9-79-045) defines baseline BMPs as "those management practices generally considered to be good practices that are low in cost and are applicable to broad categories of industry and types of substances." According to the *Guidance Manual for Developing Best Management Practices (BMP)* (EPA-833-B-004), "BMPs are inherently pollution prevention practices. Traditionally, BMPs have focused on good housekeeping measures and good management techniques intending to avoid contact between pollutants and water media as a result of leaks. spills, and improper waste disposal."

BMPs include but are not limited to good housekeeping, preventive maintenance, inspections, record management, and training. Descriptions of these BMPs are based on EPA-833-B-004 and are provided in the following sections. The applicability and degree of each BMP varies with each waste stream depending on the potential contaminants, volume of discharge, and the duration of discharge.

A checklist of appropriate handling practices for hydrotest, maintenance, construction, cooling water, condensate, and other discharges is provided in Appendix A, Table A-1. BMPs identified specifically for the HAMMER pond are provided in Appendix A, Table A-2. The following sections provide general descriptions of BMPs and why these are important in protecting the quality of groundwater.

7.1 GOOD HOUSEKEEPING

Good housekeeping is the maintenance of a clean, orderly work environment. Maintaining an orderly facility means that materials and equipment are neat and well maintained to prevent releases to the environment. Together, the terms clean and orderly define a good housekeeping program.

Examples of good housekeeping could include neat and orderly storage of bags, drums, and chemicals; prompt cleanup of spilled liquids to prevent significant run-off to surface water or infiltration to groundwater; sweeping, vacuuming, or other cleanup of chemical accumulations as necessary to prevent these from reaching the environment; and provisions for materials stored or accumulated outdoors or situated in a location that could be released to the soil.

Maintaining personnel support in good housekeeping is vital. Monitoring methods for maintaining good housekeeping practices include regular housekeeping inspections by management; discussions of housekeeping at safety meetings and pre-job briefings; and publicity through posters, suggestion boxes, bulletin boards, slogans, or incentive programs.

7.2 PREVENTIVE MAINTENANCE

Preventive maintenance is a method of periodically inspecting, maintaining, and testing equipment and systems to uncover conditions that could cause breakdowns or failures. Such breakdowns could result in significant discharges of chemicals to the environment. Adjustment, repair, or replacement of equipment helps prevent breakdowns and failures. An effective preventive maintenance program is important to prevent spills or releases.

A preventive maintenance program could include (1) identification of equipment or systems applicable to the program; (2) periodic inspections or tests of identified equipment and systems; (3) appropriate adjustment, repair, or replacement of equipment; and (4) maintaining records of applicable equipment and systems maintenance activities. Documentation on preventive maintenance could include a list of procedures, an example of record keeping, a list of the principal systems applicable to the program, and directions for obtaining the records on any particular system.

7.3 INSPECTIONS

Inspections provide an ongoing method to detect and identify sources of actual or potential environmental releases. Inspections are important for process control and to ensure that procedures are implemented properly. Inspections could include equipment, systems, and facility areas identified as having the potential for significant discharges. The nature of chemicals handled, materials of construction, and site-specific factors including age, inspection techniques, and cost-effectiveness, also should be considered for inspection.

Inspections could occur before, during, and after discharges and could include examination of pipes, pumps, tanks, supports, foundations, dikes, and drainage ditches. Inspections also could include

examination for leaks, seepage, and overflows from land disposal sites such as spray fields, pits, ponds, lagoons, and landfills. Documentation should be kept to determine if changes in preventive maintenance or good housekeeping procedures are necessary.

7.4 TRAINING

Personnel training is a method to instill in responsible personnel an understanding of this plan, including the reasons for developing the Plan and the positive impacts of the Plan. Specifically, personnel responsible for discharges covered by Permit ST 4508 and ST 4509 should know why BMPs are necessary to protect the environment and know the types of BMPs that could be used for each process and related activities. This knowledge will assist those who plan and oversee the jobs to identify discharges that might affect groundwater. This Plan, which addresses permit requirements and provides basic pollution prevention/BMP information, could be used as a training tool; e.g., required reading. Training should occur before discharge and could include reading to become knowledgeable concerning the BMPs, as well as briefings at pre-job safety meetings.

7.5 RECORDS MANAGEMENT

Maintaining complete and accurate records for the prescribed retention period is important to avoid duplication of effort, to provide a basis for effective work planning, and to provide readily accessible data for reporting purposes. For example, records of pre-, during, and post-discharge measurements and samples could provide useful lessons learned information that could be considered when planning future discharges.

Good records management assists the administrative and regulatory aspects of compliance, as well as preserving the history of hydrotest, maintenance, and construction cooling water and condensate discharge activities. Recordkeeping requirements specific to Permit ST 4508 and ST 4509 are described in Section 8.5.

8.0 PERMIT REQUIREMENTS

This section describes individual requirements specified in Permits ST 4508 and ST 4509. Permit requirements and the associated permit numbers are in bold italics; additional guidance is provided for each requirement. Underlined text indicates that the requirement is specific to Permit ST 4508.

8.1 DISCHARGE QUANTITY LIMITATIONS

For a discharge to be covered by Permits ST 4508 or ST 4509, the following conditions must be met.

S1.B.1 Each discharge must be less than 10 gallons per minute averaged annually Annual average flow is calculated for each discharge as total gallons discharged in a calendar year, divided by the number of minutes in that year. This means that the permits do not cover any single discharge greater than 5,292,500 gallons (10 gallons per minute (gpm) x 60 minutes x 24 hours x 365 days). A single discharge is a continuous or batch wastewater stream discharging to the same location from the same process.

S1.B.2 Each discharge must be less than 150 gallons per minute instantaneously. This means that the maximum flow rate for a single discharge must be less than 150 gpm at any one time. This is to allow time for the water to infiltrate into the soil and minimize erosion. An exception to this requirement is identified in Permit ST 4508 for drinking water line flushing activities, which include:

- Opening hydrants to flush contaminants from drinking water lines
- Flushing drinking water lines that have been sanitized by the addition of chlorinated water
- Flow testing of drinking water lines
- Flushing after hydrotesting of drinking water lines.

These activities will be allowed to exceed the 150 gpm limit for up to 20 minutes, but at no time will be allowed to exceed 1,000 gpm.

NOTE: If a planned discharge cannot meet these two discharge limitations, but meets the WAC 173-200 Ground Water Quality Criteria (GWQC), a written request could be submitted to Ecology for coverage of the discharge under this permit. The request must be submitted at least 10 working days before the planned discharge, and must include the information specified in Permit ST 4508, Special Condition S7.A. If the request is denied, a one-time application for a limited duration permit must be submitted for the discharge.

S2.A The total flow of all discharges covered by permit shall not exceed the maximum daily flow of 2,000,000 gallons. This condition will be considered to be met as long as the flow total of all measured significant discharges (as defined in special condition S6) is below 1,500,000 gallons per day. Special Condition S6 of Permit ST 4508 defines significant discharges as "a single discharge over 14,500 gallons in a 24-hour period or a single discharge over 50,000 gallons total in a calendar year".

S4.D Reasonable efforts shall be taken to prevent ponding due to discharge flow rates above the expected soil infiltration capacity. Reasonable efforts could include selecting an appropriate discharge location, selecting an appropriate discharge rate, inspecting the discharge location during discharge for ponding, or any other appropriate efforts.

8.2 SOURCE WATER LIMITATIONS

S3 The only allowed source waters to be used by hydrotest, maintenance, and construction activities are raw Columbia River water, potable water (treated Columbia River water or groundwater), or demineralized water (treated potable water). The State Waste Discharge Permit Application for Hydrotest, Maintenance, and Construction Discharges (DOE/RL-95-93, Rev. 0) describes the quality of these source waters and lists potential contaminants contained in each source water. No sampling and analysis of the source water is required by this permit, however routine and effective operation of the potable water plants require monitoring of the source waters. If new contaminants or levels of previously identified contaminants are detected at or above the GWQC, or if the level of a contaminant increases by more than 10% for any contaminant in a source water, then the Permittee shall notify Ecology, and Ecology will evaluate if the water should still be used as source water.

Raw water has been filtered through a course screen, but has not been treated. The raw water is converted into potable water through conventional water treatment facilities located in the 100-K, 100-N, 200, 300, and 400 Areas, as well as in the city of Richland. Groundwater (potable well water) also is

used as source water for Hanford Site activities. Demineralized water is generated by filtration followed by a mixed bed ion exchange, and is used to verify that discharge pumps are working properly.

These raw and potable source waters must maintain the quality as described in Tables 5-1 through 5-4 of DOE/RL-95-93. Although no sampling and analysis of source water are required by the permit, routine and effective operation of the potable water treatment plants do require monitoring of source waters.

S1.B.3 Each discharge must meet WAC 173-200 Ground Water Quality Criteria (GWQC) unless the discharge is expected to have a contaminant that exceeds the GWQC solely because the source water has a contaminant that exceeds one or more of the GWQC. Also, discharges that exceed the GWQC at the effluent, but are prevented from impacting ground water quality, would be covered by this permit.

Source water analytical information can be found in DOE/RL-95-93. If BMPs are evaluated and followed, and approved source water is used, this requirement will be met.

NOTE: Refer to the permit application (DOE/RL-95-93) for examples of acceptable analytical and sampling methods.

S5.A Plan Elements. The Permittee shall develop and implement a pollution prevention and BMPs plan for all discharges covered by this permit. This plan shall provide guidance on appropriate handling of hydrotest, maintenance, and construction discharges on the Hanford Site and the plan shall incorporate all the terms and conditions of this permit. The plan should be usable as a training document for all employees responsible for hydrotest, maintenance and construction discharges. Recommendations and guidance for this plan may be taken from appropriate Ecology publications, industrial association publications (e.g., guidance from the Associated General contractors of Washington), or other sources, with additional Hanford Site specific details added. For discharges where the effluent is expected to exceed the GWQC or 100% of the contaminant level in the source water, the plan must specify how impacts to ground water quality will be prevented. Separate plans for each category covered by this permit (hydrotest, maintenance, and construction discharges) would also be acceptable.

The plan or plans should be broken down by categories and sub-categories so that each individual discharge covered by this permit can point to a specific section of the plan(s) for the appropriate pollution prevention and BMPs for the particular discharge. If an individual discharge cannot point to a specific section of the plan(s) for the appropriate pollution prevention and BMPs, then such a discharge is not covered by this permit until an appropriate section is added to the plan(s).

A draft of this plan(s) is due to Ecology within 180 days after the effective date of this permit. The final plan(s) will be due to Ecology 90 days after receiving Ecology written comments on the draft plan(s).

Impacts to groundwater will be prevented by implementing the BMPs in Appendix A, Tables A-1 and A-2.

8.3 DISCHARGE LOCATION LIMITATIONS

All discharges covered by Permits ST 4508 and ST 4509 will implement the following BMPs where appropriate.

S4.A No discharge shall be allowed within a surface contaminated area (areas with dangerous waste and/or radioactive contaminants). Surface contaminated areas are defined as those near-surface soils contaminated with dangerous and/or radioactive wastes.

S4.B No discharge shall be allowed within 300 feet horizontal radius of a known active or inactive crib, ditch, or trench used for disposal of dangerous and/or radioactive contaminants. Cribs, ditches and trenches were used to dispose of effluents that may have contained dangerous and/or radioactive contaminants.

S4.C No discharge shall be allowed to affect an ecologically sensitive area. Discharges will avoid or minimize impacts to areas where species of concern, as defined in the Hanford Site Biological Resources Management Plan (DOE/RL-96-32), are located. The reason 'minimize' is indicated is because a species of concern could be a migratory bird and they can be located anywhere throughout the site. A minimizing action could be to conduct the discharge when the migratory birds are elsewhere.

S4.E There shall be no discharges or runoff of wastewater to any surface waters of the state or to any land not owned by or under control of the Permittee. Facilities permitted to discharge wastewater to surface waters of the state are regulated under the NPDES Permit and are excluded from this plan.

S4.F If the discharge meets the conditions of State Waste Discharge Permit ST 4502 for the 200 Area Treated Effluent Disposal Facility (TEDF), and the discharge is near a connection to the TEDF collection system, then all reasonable attempts should be made to discharge to the TEDF. Discharge to other permitted wastewater treatment facilities, such as the 300 Area TEDF, is also acceptable, if such a discharge is allowed under the other treatment facilities discharge permit. Discharges to other permitted wastewater treatment facilities could be performed if such a discharge is allowed under the other treatment facility's waste water discharge permit.

8.4 DISCHARGE TRACKING (ST 4508 ONLY)

S6 Significant discharges covered by this permit shall be tracked. A significant discharge is any single discharge over 14,500 gallons in a 24 hour period or any single discharge over 50,000 gallons total in a calendar year. These significant discharges will be recorded in a log. Information required to be kept in this log includes type and date of discharge, source water, additives, total volume (gallons), discharge rate (gallons/minute), location, soil loading rate (gallons/minute/square feet), name of assigned responsible person (as described in special condition S5.B), and other pertinent information. The log for each calendar year shall be submitted to Ecology by the following February 15th, annually.

8.5 RECORD KEEPING

G10 The Permittee shall retain records of all monitoring information, including all calibration and maintenance records and all original recordings for continuous monitoring instrumentation, copies of all reports required by this permit, and records of all data used to complete the application for this permit, for a period of at least three years. This period of retention shall be extended during the course of any unresolved litigation regarding the discharge of pollutants by the Permittee or when requested by the Director of Ecology.

For each measurement or sample taken, the Permittee shall record the following information: (1) the date, exact place, and time of sampling; (2) the dates the analyses were performed; (3) who performed the analyses; (4) the analytical techniques or methods used; (5) the results of the analyses reported to the Method Detection Limit; and (6) the name of the individual who performed the sampling or provided the measurement.

9.0 PERMIT EXEMPTIONS

Currently, several categories of miscellaneous streams are not subject to permitting under WAC 173-216 and, therefore, are not subject to the provisions of this plan as defined in DOE/RL-93-94. The exemptions are as follows:

- Purgewater resulting from well sampling, well development, well rehabilitation, and aquifer testing must be managed according to *Strategy for Handling and Disposing of Purgewater at the Hanford Site, Washington.* (DOE-RL 1990).

- Industrial wastewater that is discharged to the ground for beneficial use (e.g., irrigation, aesthetics, dust control) does not require permitting. However, industrial wastewater must meet the WAC 173-200 GWQC at the point of discharge unless it can be demonstrated to the satisfaction of Ecology that the site-specific characteristics will degrade or attenuate contaminants before reaching the groundwater, and will not generate contaminants by discharging wastewater into the environment.

- Fire test water that potentially is not contaminated is exempt from permitting. Fire test water includes fire system checks, fire system functional tests, flushing of fire systems before testing, and training exercises at training centers onsite during facility drills.

- Wastewater from washing the exterior of vehicles is exempt from permitting and must be managed according to *Vehicle and Equipment Wastewater Discharges* (WQ-R-95-56).

- Discharges to the ground from cleanup activities conducted under *Comprehensive Environmental Response, Compensation, and Liability Act* (CERCLA) *of 1980* are not required to be permitted by WAC 173-216 or registered under WAC 173-218.

10.0 REFERENCES

AGC, 1990, *Waste Disposal & Erosion/Sediment Control Methods*, October 1990, AGC of Washington, Seattle, Washington.

Consent Order No. DE 91NM-177, Washington State Department of Ecology, 1991, Olympia, Washington.

DOE-RL, 1990, Letter from R. D. Izatt, *Strategy for Handling and Disposing of Purgewater at the Hanford Site, Washington*, 90-ERB-076, August 21, 1990, U.S. Department of Energy, Richland Operations, Richland, Washington.

DOE/RL-93-94, *Plan and Schedule for Disposition and Regulatory Compliance for Miscellaneous Streams*, December 1994, Rev. 1, U.S. Department of Energy, Richland Operations, Richland, Washington.

DOE/RL-95-93, *State Waste Discharge Permit Application, Hydrotest, Maintenance, and Construction Discharges*, November 1995, Rev. 0, U.S. Department of Energy, Richland Operations, Richland, Washington.

DOE/RL-96-32, *Hanford Site Biological Resources Management Plan*, September 1996, Rev. 0, U.S. Department of Energy, Richland Operations, Richland, Washington.

DOE-RL-96-41, *State Waste Discharge Permit Application, Cooling Water and Steam Condensate Discharges*, September 1996, Rev. 0, U.S. Department of Energy, Richland Operations, Richland, Washington.

DOE/RL-96-40, *Miscellaneous Streams Best Management Practices (BMP) Report*, July 1996, Rev. 0, U.S. Department of Energy, Richland Operations, Richland, Washington.

EPA-600/9-79-045, *NPDES Best Management Practices Guidance Document*, U.S. Environmental Protection Agency, Washington, D.C.

EPA-833-B-004, *Guidance Manual for Developing Best Management Practices (BMP)*, U.S. Environmental Protection Agency, Washington, D.C.

ST 4508 Permit, "State Waste Discharge Permit No. 4508, Hydrotest Maintenance and Construction Discharges", Washington State Department of Ecology, May 30, 1997, Olympia, Washington

ST-4509 Permit, "State Waste Discharge Permit No. 4509, Cooling Water and Condensate Discharges", Washington State Department of Ecology, May 1, 1998, Olympia, Washington.

WQ-R-95-56, *Vehicle and Equipment Washwater Discharges,* Washington State Department of Ecology, Olympia, Washington.

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APPENDIX A

CHECKLIST OF BEST MANAGEMENT PRACTICES

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Table A-1. Checklist of BMPs for Permits ST 4508 and ST 4509.

✔	PRE-DISCHARGE BMPs	
	Good Housekeeping Practices	Maintain general good housekeeping practices. Refer to Section 7.1 for examples.
	Preventive Maintenance Program	Maintain a preventive maintenance program. Preventive maintenance assists in minimizing contaminants by fixing potential problems early. Refer to Section 7.2 for examples.
	Inspections	Inspect piping components and surrounding area for potential contamination. Before the scheduled discharge, an inspection of the piping, valves, etc. and surrounding area should be performed to identify leaking valves, equipment, spills, contaminated soil, or other material that might present a potential for contamination during discharge.
	Training	In addition to the general pollution prevention training provided on the Hanford Site, personnel responsible for hydrotest, maintenance, and construction discharges should receive additional training that could include reading this document and being able to identify and implement suitable BMPs for the applicable processes covered under Permits ST 4508 and ST 4509.
	Cleaning	If valves or other equipment involved in the discharge show signs of visual contamination such as oil, wipe down, if necessary, the appropriate areas before discharge. If nonhazardous solvent is used, allow the solvent to evaporate before the discharge begins.
	Source Water	The appropriate source water should be used before discharge. Source water includes raw Columbia River water, potable water, and demineralized water.
	Location Criteria	Ensure discharge locations meet required criteria. A map should be reviewed, as well as performing a visual inspection, to identify all items necessary. Location limitations are provided in the permits and in Section 8.3 of this document.
✔	DURING DISCHARGE BMPs	
	Maintain Required Flow Rates	Maintain discharge flow rates within required ranges. Refer to Section 8.1 for additional detail as needed.

Table A-1. Checklist of BMPs for Permits ST 4508 and ST 4509.

	Minimize Solids	Minimize discharged solids with strategically placed filters (e.g., screen) if appropriate. Before each discharge, the responsible person should determine the appropriate BMPs. Filtering the wastewater is one BMP that may or may not be appropriate. If the wastewater quality can be moderately increased with minimal effort, such as filtering, the appropriate BMPs should be implemented.
	Collect Discharge	Before each discharge, the responsible person should determine the appropriate BMPs. Collecting the wastewater is one BMP that may or may not be appropriate. Collect discharge, if appropriate, and visually inspect for contaminants. Whenever appropriate, all water should be recycled and reused. If there is a reasonable potential for contamination, the wastewater should be sampled before discharge to the ground.
	Removed Substances	Collected screenings, grit, solid, sludge, filter backwash, oil, or other pollutants removed in the course of treatment or control of wastewaters to the effluent stream for discharge should not be resuspended or reintroduced to the waste water stream per Permit condition requirement G.7.
	Minimize Ponding	If ponding occurs because of the flow rate, all reasonable efforts should be made to reduce the flow rate or move the discharge point to another suitable location.
	Minimize Discharge	Minimize the amount of water used, thereby limiting the amount of discharge.
	Minimize Additives	If using a detergent or additive, minimize the amount used. Nonhazardous additives should be used when feasible.
	Inspections	Inspect equipment or system for leakage during the discharge.
	Recycle/Reuse	Use water for dust control or irrigation whenever possible. Recycle wastewater whenever possible.
✔	**POSTDISCHARGE BMPS- HYDROTEST DISCHARGES**	
	Documentation	Document discharge characteristics as required in Section 8.4, and report the discharge to personnel in charge of logging all discharges.
	Lessons Learned	Review the discharge process and determine if there is anything else that can be done next time to minimize potential pollutants in the wastewater, to minimize the amount of water used, and/or to recycle or reuse wastewater.

Table A-2. Checklist of BMPs for HAMMER Pond.

✔	PREDISCHARGE BMPs	
	Good Housekeeping	Maintain general good housekeeping practices as described in Section 7.1. All hazardous materials, equipment, or other items with the potential to contaminate wastewater should be properly stored away from the pond and associated drains.
	Preventive Maintenance	Weekly water level measurements of the pond will be taken to identify any large leaks in the pond liner. However, water levels will fluctuate depending on the precipitation , the number of training exercises, evaporation rates, etc.
	Inspections	Inspect visible portions of the pond liner monthly for cracks or other potential problems. In addition, inspect the surrounding area for potential contamination.
	Training	In addition to the general pollution prevention training provided on the Hanford Site, personnel responsible for hydrotest, maintenance, and construction discharges should receive additional training that includes reading this document and being able to identify and implement the selected BMPs for the HAMMER Pond.
	Cleaning	The entire pond will be drained, inspected and refilled with potable water once every 5 years.
	Location Criteria	Ensure discharge location meets required criteria provided in the Permits and Section 8.3 of this document.
	Water Treatment	Chemical additives (e. g., bleach, and algaecides) are added to the pond to control algae, bacteria, and bugs. Chemicals will be added when algae visually is observed in the pond and will be maintained at the minimal level to prevent algae growth. Currently, bromide is added to maintain a concentration of approximately 1 part per million. Weekly samples will be collected and analyzed. Chemicals will be added into the pond via the artificial stream of the recirculation system.
✔	DURING DISCHARGE BMPs	
	Protect Drains	Vehicles allowed to park near the drain lines that carry water used in the training exercises back to the pond for reuse will be monitored for spills and leaks. This will prevent oil contamination of the water in the pond.
	Simulate Hazardous Materials	Props will be used to simulate hazardous materials for the purposes of the training exercises. For example, a drum might be labeled as 'hazardous waste' but only will contain water.
	Minimize Additives	As stated under Water Treatment, additives should be maintained at the minimum levels required to control algae, bacteria, and bug problems. Operations personnel will continue to review and evaluate chemical additives in an effort to identify more environmentally acceptable alternatives.

Table A-2. Checklist of BMPs for HAMMER Pond.

	Removed Substances	Collected screenings, grit, solid, sludge, filter backwash, or other pollutants removed in the course of treatment or control of waste waters to the effluent stream for discharge should not be resuspended or reintroduced to the waste water stream per Permit condition requirement G.7.
	Inspections	Responsible personnel should inspect the surrounding areas for chemical spills during the training exercises.
	Recycle/Reuse	Water used during training exercises should be recycled back to the pond through the drain system.
✔	**POSTDISCHARGE BMPs**	
	Documentation/ Notification	If a problem is observed during the inspections, personnel should notify Air and Water Services, Waste Management Federal Services of Hanford, Inc..

APPENDIX B

SIGNIFICANT DISCHARGE LOG FOR STATE WASTE DISCHARGE PERMIT ST 4508

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Table B-1. Significant Discharge Log for State Waste Discharge Permit ST 4508.

Company ___ _____

Date	Discharge type	Discharge location	Source water[1]	Additives	Total volume discharged (gallons)	Flow rate[2] (gpm)	Soil loading Rate[3]	Responsible person	Comments

gpm = gallons per minute.
ft^2 = square feet.
[1] Surface water or potable water. [2]Flow rate (gpm)=Total discharge volume (gallons) / Total time of discharge (minutes) [3]Soil loading rate (gpm/ft^2)= Flow rate (gpm) / Surface area of discharge (ft^2)

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